

REMARKS

The application has been amended and is believed to be in condition for allowance.

Previously, the case was pending with claims 1-6. Claim 1 is independent. This amendment amends claim 6 as to form, removing preferred ranges. New claim 10 includes the recitations eliminated from claim 6.

New independent claim 7 is based on claims 1-4, redrafted slightly as to form and to specifically recite that exclusively ultrasounds are used by the ultrasonic decantation device. Dependent claims 8-9 are based on original claims 5-6.

New independent claim 11 is based on original claim 1, drafted slightly different as to form and including the recitation that exclusively ultrasounds are used by the ultrasonic decantation device. New dependent claims 12-17 are based on the originally-filed dependent claims.

The specification and abstract have been amended as to form.

Claims 1-6 stand rejected as obvious over FREI (CH 670785) in view of applicant's disclosure of prior art, and further in view of BARMATZ et al. 4,523,682.

Claim 5 stands rejected as obvious over these references and further in view of LEE 4,701,260.

FREI is offered as disclosing an electro-erosion machine 44 with an electrode 44 and a piece 42, the machining liquid 43 being a dielectric liquid containing particles which facilitate electro-erosion. FREI is also offered as teaching means 30 for cleaning and regenerating the machining liquid.

The Official Action acknowledges that FREI fails to disclose recitations of claim 1, including second contamination particles. The Official Action suggests that this disclosure is inherent to FREI.

However, it is acknowledged that FREI does not disclose the recited elements concerning the contaminant particles being separated from the machining liquid via an **ultrasonic** decantation device.

For the missing recitations concerning the ultrasonic decantation device, BARMATZ et al. has been offered. BARMATZ et al. does not disclose that for which it has been offered.

BARMATZ et al. does disclose a method using acoustic energy to separate particles of different densities. The method (see Abstract) includes applying acoustic energy resonant to a chamber (14) to set up a standing wave pattern wherein particles are urged towards the center, or position of minimum force potential.

Applicant finds no teachings as to the use of ultrasounds (ultrasonic energy). Indeed, BARMATZ et al. teaches a method very different from that of the present invention.

BARMATZ et al. teaches applying sinusoidal acoustic energy to a chamber, of a wavelength that is resonant to a chamber mode, to establish an acoustic standing wave pattern. The standing wave pattern includes a force potential well with a center, or minimum force potential, to which particles are urged, for particles initially lying anywhere from the center to the edge of the well. At the same time, a non-acoustic force field (gravity, electrostatic, or magnetic) is applied to the chamber to urge particles away from the center of the well and towards or beyond an edge of the well. A plurality of particles are positioned within the force potential well, and each particle moves to a position at which the opposing forces (the acoustic force and the second non-acoustic force) are equal. Particles are separately removed as from different positions within the well, to separate the particles according to the positions they assumed in the well. See the Summary of the Invention section of BARMATZ et al.

In the Description of the Preferred Embodiments section, there is disclosed that particle separation is based on the use of acoustic energy, which is applied by a driver 26 that includes an oscillator 28 that drives a transducer 30 coupled to

the top of the chamber at an end wall 32 thereof. The transducer 30 is driven at a frequency that produces sound of a wavelength equal to twice the height H of the cross section of the chamber. This is the lowest acoustic mode of a chamber of that height, and it produces a pressure node at a height $H/2$, where the pressure in the chamber is a minimum, and which corresponds to the center or minimum of a force potential well.

From this passage there is a clear teaching away from that of the present invention and clearly no suggestion of using ultrasonics.

BARMATZ et al. uses the term "acoustic" in an insistent manner for describing his invention. He does not use the terms "ultrasounds" or "ultrasonic". In a general sense, acoustic phenomena concern the sound perception, which means the audible frequencies, to the contrary of the inaudible frequencies that are the ultrasounds. The latter are vibrations of the same nature, but of a frequency which is too high for being perceived by the human ear. In general, ultrasounds frequencies are situated from 20 kHz to several hundreds of megahertz.

According to BARMATZ et al., audible frequencies between 500 Hz and 5000 Hz allow to tune acoustic waves to chambers and containers of a height comprised between 1m and 10cm. These dimensions are quite adequate for obtaining devices

intended to separate particles in suspension in a liquid. However, these are not ultrasounds.

However, by applying the "twice the height of the chamber" teaching of BARMATZ et al. to a 20 kHz ultrasound, one would use a container with a height less than 20 mm for ultrasounds of 20 kHz. These dimensions are definitely not adequate for any EDM application. Therefore, even if BARMATZ et al. were applied, one of skill would not find this a viable option. Thus, BARMATZ et al. cannot teach the solution according to the invention in which ultrasonic waves are used, but teaches away from the claimed feature by using acoustic and not ultrasonic waves.

By using ultrasounds as taught by applicant, it is not necessary to adapt the dimensions of the container to the frequencies of the waves used or inversely. For applicant, this problem of adaptation does not occur. It is an important advantage, by using ultrasounds instead of acoustic waves, the device of applicant may be mounted in any kind of container of EDM machine already existing without the necessity of adapting or modifying the container or the wavelength. It is only necessary to adapt the power of the ultrasound generator for selecting a type of particles which has to be maintained in suspension. If more than one type of particles has to be separated, it is only necessary to repeat the operation with another power, and not

with another wavelength adapted to the dimensions of the container.

Moreover, the use of acoustic waves according to BARMATZ et al. is not possible in a working place with several EDM machines. No operator of such machines would accept to endure such a permanent whistling acoustic sound at his working place. According to the present invention, this noise problem does not occur, as the ultrasonic waves are inaudible.

As stated by MPEP §706.02(j), to establish a *prima facie* case of obviousness, the Official Action must first, consider the relevant teachings of the prior art, and after determining the differences between the pending claim and the prior art teachings, second, propose modifications of the prior art necessary to arrive at the claimed subject matter, explaining the motivation for combining the particular references and making the proposed modifications to those references. Thus, there must be motivation to modify the references and a teaching or suggestion of all the claim recitations.

As noted above, the claim 1 recitation of ultrasounds is neither taught nor suggested by the applied references. Further, to arrive at the claimed subject matter, the first disclosed prior art would need to be modified to use ultrasounds. Rather, the prior art teaches away from ultrasounds as the relied

upon disclosed prior art teaches that providing an acoustic wavelength to approximate twice the height of the chamber.

Only the present application offers this ultrasound disclosure. Further, it is well established that in addition to needing a teaching or suggestion to make the claimed combination, there must also be a reasonable expectation of success. Both these factors must be found in the prior art, and not be based on the present disclosure. *In re Vaeck*, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

As discussed above, the "twice the chamber height" teaching would not be viable in an ultrasound application.

Further, the prior art references must either expressly or impliedly suggest the claimed invention or the Official Action must convincingly reason why one skill in the art would have found the claimed invention obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972, 973 (Bd. Pat. App. & Inter. 1985). In the present situation, there is no teaching or suggestion available to provide the requisite motivation, suggest the necessary modifications, or provide the reasonable expectation of success. Thus, the obviousness rejection is not believed to be viable.

Accordingly, reconsideration and allowance of all the pending claims are respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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APPENDIX:

The Appendix includes the following item:

- an amended Abstract of the Disclosure